What Is Claimed Is:

1. Apparatus for simultaneously reading multiple adjacent tracks of an optical disk, the apparatus comprising:

optical devices for generating a plurality of reading beams including a center beam;

an optical system disposed in a path of the plurality of reading beams, the optical system directing the plurality of reading beams onto a surface of the optical disk;

a plurality of split photodetector elements including a center element and a plurality of side elements, the center element generating an output signal corresponding to the center beam, at least one of the plurality of side elements generating an output signal for a corresponding one of the plurality of reading beams; and

a cross-talk cancellation apparatus that reduces cross-talk and jitter.

2. The apparatus of claim 1, wherein the center element is a quadrant detector.

3. The apparatus of claim 1, wherein the plurality of side elements comprise a plurality of split photodetectors, each split photodetector divided into a first and a second photodetector segment in a radial direction.

4. The apparatus of claim 3, wherein the first and the second photodetector segment are divided into the perpendicular direction when astigmatic focus is used in the optical system.

5. The apparatus of claim 1, wherein the cross-talk cancellation apparatus:

determines the track offset of the optical disk;

verifies if the track offset is below or above a threshold value, wherein the threshold value is a function of the track pitch of the optical disk; and

applies cross-talk cancellation to correct cross-talk and jitter for the output signal of at least one of the side elements according to the track offset.

6. The apparatus of claim 5, wherein applying cross-talk cancellation according to the track pitch comprises forming a first and a second weighted sum of the output signal for a first track of the optical disk and an output signal generated for an adjacent second track of the optical disk, the first weighted sum corresponding to the first segment of the side element and the second weighted sum corresponding to the second segment of the side element.

7. The apparatus of claim 6, wherein weights used in computing the first and the second weighted sums are determined experimentally and through simulation.

8. The apparatus of claim 6, wherein applying cross-talk cancellation according to the track pitch comprises generating a signal as a weighted combination of the first and the second weighted sums.

9. The apparatus of claim 8, wherein weights used in the weighted combination are functions of the track offset.

10. The apparatus of claim 1, wherein the apparatus is incorporated into a disk drive.

11. A method for simultaneously reading multiple data tracks from an optical disk, the method comprising:

receiving a plurality of reading beams including a center beam;

providing a plurality of split photodetector elements including a center element and a plurality of side elements, the center element generating an output signal corresponding to the center beam, at least one of the plurality of side elements generating an output signal for a corresponding one of the plurality of reading beams;

correcting cross-talk and jitter caused by a track offset in the optical disk for the output signal for the at least one of the plurality of side elements.

12. The method of claim 11, wherein the center element is a quadrant detector.

13. The method of claim 11, wherein the plurality of side elements comprise a plurality of split photodetectors, each split photodetector divided into a first and a second photodetector segment.

14. The method of claim 13, wherein the the first and the second photodetector segment are divided into the perpendicular direction when astigmatic focus is used in the optical system.

15. The method of claim 11, wherein

correcting for cross-talk and jitter comprises:

measuring the track offset of the optical disk;

verifying if the track offset is below or above a threshold value; and

applying cross-talk cancellation to correct cross-talk and jitter for the output signal of at least one of the side elements according to the track offset.

16. The method of claim 15, wherein the threshold value is a function of the track pitch of the optical disk.

17. The method of claim 15, wherein applying cross-talk cancellation according to the track pitch comprises forming a first and a second weighted sum of the output signal for a first track of the optical disk and an output signal generated for an adjacent second track of the optical disk, the first weighted sum corresponding to the first segment of the side element and the second weighted sum corresponding to the second segment of the side element.

18. The method of claim 17, wherein weights used in computing the first and the second weighted sums are determined experimentally and through simulation.

19. The method of claim 17, wherein applying cross-talk cancellation according to the track pitch comprises generating a signal as a weighted combination of the first and the second weighted sums.

20. The method of claim 19, wherein weights

used in the weighted combination are functions of the track offset.

21. A detector for a multi-beam optical disk system, the detector comprising a plurality of split photodetector elements including a center detector element and a plurality of side elements, at least two of the side elements divided into a first and a second photodetector segment, the split photodetector elements used to reduce cross-talk in the multi-beam optical disk.

22. The detector of claim 21, wherein each side element is divided into a first and a second photodetector segment in the radial direction.

23. The detector of claim 21, wherein each side element is divided into a first and a second photodetector segment in the perpendicular direction when astigmatic focus is used in the optical disk system.

24. The detector of claim 21, wherein the detector is incorporated into a disk drive.

25. A method of using a detector as described in claim 21, the method comprising:

determining the track offset of an optical disk read by the optical disk system;

verifying if the track offset is below or above a threshold value; and

applying cross-talk cancellation to correct cross-talk and jitter for the output signal of at least one of the side elements according to the track offset.

26. The method of claim 25, wherein the threshold value is a function of the track pitch of the optical disk.

27. The method of claim 26, wherein applying cross-talk cancellation according to the track pitch comprises forming a first and a second weighted sum of the output signal for a first track of the optical disk and an output signal generated for an adjacent second track of the optical disk, the first weighted sum corresponding to the first photodetector segment of the side element and the second weighted sum corresponding to the second photodetector segment of the side element.

28. The method of claim 27, wherein weights used in computing the first and the second weighted sums are determined experimentally and through simulation.

29. The method of claim 25, wherein applying cross-talk cancellation according to the track pitch comprises generating a signal as a weighted combination of the first and the second weighted sums.

30. The method of claim 29, wherein weights used in the weighted combination are functions of the track offset.

31. A method for simultaneously reading multiple data tracks from an optical disk, the method comprising:

receiving a plurality of reading beams including a center beam;

providing a plurality of split photodetector elements including a center element and a plurality of side elements, the center element generating an output signal corresponding to the center beam, at least one of the plurality of side elements generating an output signal for a corresponding one of the plurality of reading beams;

measuring the track offset of the optical disk;

verifying if the track offset is below or above a threshold value;

applying a first cross-talk cancellation algorithm to correct cross-talk and jitter for the output signal of at least one of the side elements if the track offset is smaller than the threshold; and

applying a second cross-talk cancellation algorithm to correct cross-talk and jitter for the output signal of at least one of the side elements if the track offset is equal to or bigger than the threshold.

32. The method of claim 31, wherein the center element is a quadrant detector.

33. The method of claim 31, wherein the plurality of side elements comprise a plurality of split photodetectors, each split photodetector divided into a first and a second photodetector segment.

34. The method of claim 33, wherein the

first and the second photodetector segment are divided into the perpendicular direction when astigmatic focus is used in the optical system.

35. The method of claim 31, wherein applying a first cross-talk cancellation algorithm and applying a second cross-talk cancellation algorithm comprise forming a first and a second weighted sum of the output signal for a first track of the optical disk and an output signal generated for an adjacent second track of the optical disk, the first weighted sum corresponding to the first segment of the side element and the second weighted sum corresponding to the second segment of the side element.

36. The method of claim 35, wherein weights used in computing the first and the second weighted sums are determined experimentally and through simulation.

37. The method of claim 31, wherein applying a first cross-talk cancellation algorithm comprises generating a signal as a weighted combination of the first and second weighted sums.

38. The method of claim 31, wherein applying the second cross-talk cancellation algorithm comprises generating a signal as a weighted combination of the first and second weighted sums.